ANACONDA Minerals Company
555 Seventeenth Street
Denver, Colorado 80202
Telephone 303 293 4000

January 27, 1988

Mr. Lowell P. Braxton, Administrator
Division of Oil, Gas & Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84189-1203

RE: Carr Fork Reclamation -- Pine Canyon Creek Water Quality and Waterfall Survey Results

Dear Mr. Braxton:

As required in our approved Carr Fork Reclamation Plan, enclosed are the surface water monitoring results for the third and fourth sampling quarters of 1987 and a copy of a JBR memorandum which provides a summary of the quarterly Pine Canyon waterfall survey results.

The water quality remained relatively stable during the third and fourth quarters and comparable with previous samples collected over the past twelve months. The water quality within Pine Creek which leaves our property continues to be well within the federal drinking water standards for metals. Only stations SW-8, Pine Creek at the diversion dam downstream of the landfill; and SW 12, Pine Creek at the mouth of Pine Canyon were sampled in October as the stream was dry at the other two stations.

As you will note from review of the JBR memorandum, the headcutting associated with the waterfall located at the mouth of Pine Canyon was minimal over the past four quarters of inspection.

Dave Wham: please review and advise. Thx Jim 2/5

Since the previous quarterly sampling has shown minimal change in the overall water quality in Pine Creek and headcutting of the waterfall, Anaconda requests that the frequency in monitoring for both water quality and waterfall headcutting be reduced to semiannual monitoring over the remaining two years. Anaconda feels that this reduced sampling frequency will help to reduce our overall monitoring costs associated with the project site and will not jeopardize our understanding of the reclamation project's impact on the stream.

If you or your staff have any questions regarding the enclosed analytical and survey reports, or would like to discuss our request for a change in monitoring frequency, please feel free to contact me at (303) 293-7938.

Sincerely,

Robert L. Dent
Minerals Environmental Manager

RLD/das
Enclosures
cc: B. Buck w/o enclosures

CHEMTECH

CHEMICAL AND BACTERIOLOGICAL ANALYSES

367 SOUTH COMMERCE LOOP
OREM, UTAH 84057
(801) 226-8822

2875 MAIN
SUITE #101
SALT LAKE CITY, UTAH 84115
(801) 483-1162

August 25, 1987

TO: JBR Consultants
1841 E. Fort Union Blvd.
Salt Lake City, UT 84124

DATE SUBMITTED: 8-11-87

CERTIFICATE OF ANALYSIS

SAMPLE ID:	SW-7	SW-8	SW-9	SW-12
LAB #:	U020341	U020342	U020343	U020344
PARAMETER				
Alkalinity as $CaCO_3$, mg/l	139	180	182	187
Bicarbonate as HCO_3, mg/l	169	198	202	213
Carbonate as CO_3, mg/l	0	10.7	10.0	7.2
Hydroxide as OH, mg/l	0	0	0	0
Chloride as Cl, mg/l	36.5	27.4	27.3	26.4
Fluoride as F, mg/l	2.01	<.1	0.31	0.02
Hardness as $CaCO_3$, mg/l	393	257	252	252
Conductivity, umhos/cm	971	541	552	542
pH Units	7.88	8.55	8.50	8.47
Potassium as K, mg/l	25.8	1.0	0.8	1.4
Sodium as Na, mg/l	48.2	20.5	20.6	21.2
Sulfate as SO_4, ,mg/l	352	81	61	75
TDS, mg/l	763	380	400	400
Ammonia as NH_3-N, mg/l	0.12	<.1	<.1	<.1
Nitrate as NO_3-N, mg/l	1.02	0.86	0.89	0.99
Nitrite as NO_2-n, mg/l	<.005	<.005	<.005	<.005
Aluminum (D) as Al, mg/l	<.01	<.01	<.01	<.01
Arsenic (D) as As, mg/l	<.01	<.01	<.01	<.01
Barium (D) as Ba, mg/l	<.01	<.01	<.01	<.01

Rex Henderson

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LAB #:	U020341	U020342	U020343	U020344
PARAMETER				
Boron (D) as B, mg/l	0.12	0.18	0.15	0.22
Cadmium (D) as Cd, mg/l	0.015	<.01	<.01	<.01
Chromium (D) as Cr, mg/l	<.01	<.01	<.01	<.01
Chromium (Hex) as Cr, mg/l	<.01	<.01	<.01	<.01
Copper (D) as Cu, mg/l	0.048	<.01	<.01	<.01
Iron (D) as Fe, mg/l	0.26	0.30	0.32	0.30
Lead (D) as Pb, mg/l	<.01	<.01	<.01	<.01
Manganese (D) as Mn, mg/l	0.12	<.01	<.01	<.01
Mercury (D) as Hg, mg/l	0.00023	<.0002	<.0002	<.0002
Molybdenum (D) as Mo, mg/l	<.01	<.01	<.01	<.01
Nickel (D) as Ni, mg/l	0.060	<.01	<.01	<.01
Selenium (D) as Se, mg/l	<.002	<.002	<.002	<.002
Silver (D) as Ag, mg/l	<.01	<.01	<.01	<.01
Zinc (D) as Zn, mg/l	8.80	<.01	<.01	<.01
Silica as SiO_2, mg/l	6.61	7.05	7.11	8.15
TSS, mg/l	1.6	2.8	2.8	4.4
Turbidity, NTU	3.4	1.4	1.3	2.1
Calcium as Ca, mg/l	103	44.3	44.2	45.4
Cations, meq/l	8.18	3.17	3.14	3.24
Anions, meq/l	11.25	6.08	5.72	6.06

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CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR
1841 E. Fort Union Blvd.
Salt Lake City, UT 84121

LAB NO: U022380

DATE SAMPLED: 10-23-87

TIME SAMPLED: 0915

SAMPLED BY: R.P.

LOCATION: Anaconda - Carr Fork
SW-12 (Pine Creek)

COMMENTS: Dissolved Metals

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	183
Ammonia as NH_3-N, mg/l	<.1
Arsenic as As, mg/l	<.01
Barium as Ba, mg/l	0.055
Bicarbonate as HCO_3, mg/l	217
Boron as B, mg/l	0.028
Cadmium as Cd, mg/l	<.01
Calcium as Ca, mg/l	69.2
Carbonate as CO_3, mg/l	3.1
Chloride as Cl, mg/l	24.4
Chromium as Cr (Hex), mg/l	<.01
Chromium as Cr (Tot), mg/l	<.01
Molybdenum as Mo, mg/l	<.01
Acidity as $CaCO_3$, mg/l	0

PARAMETER	LEVEL
Conductivity, umhos/cm	519
Copper as Cu, mg/l	<.01
Fluoride as F, mg/l	<.1
Hardness as $CaCO_3$, mg/l	255
Hydroxide as OH, mg/l	0
Iron as Fe (Diss), mg/l	0.081
Iron as Fe (Tot), mg/l	0.28
Lead as Pb, mg/l	<.01
Magnesium as Mg, mg/l	31.6
Manganese as Mn, mg/l	<.01
Mercury as Hg, mg/l	<.0002
Nickel as Ni, mg/l	<.01
Nitrate as NO_3-N, mg/l	0.46
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	<.01
Potassium as K, mg/l	1.7
Selenium as Se, mg/l	0.0022
Silica as SiO_2 (Diss), mg/l	8.0
Silver as Ag, mg/l	0.012
Sodium as Na, mg/l	16.5
Sulfate as SO_4, mg/l	104
Total Dissolved Solids, mg/l	325
Turbidity, NTU	0.87
Zinc as Zn, mg/l	0.095
pH Units	8.33
Cations, meq/l	6.83
Anions, meq/l	6.52

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CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION
CLIENT: JBR Consultants
1841 E. Fort Union Blvd.
Salt Lake City, UT 84121
LAB NO: U022379
DATE SAMPLED: 10-23-87
TIME SAMPLED: @0915
SAMPLED BY: R.P.
LOCATION: Anaconda - Carr Fork
SW-8 (Pine Creek)
COMMENTS: Dissolved Metals

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	182
Ammonia as NH_3-N, mg/l	0.12
Arsenic as As, mg/l	0.013
Barium as Ba, mg/l	0.045
Bicarbonate as HCO_3, mg/l	220
Boron as B, mg/l	0.041
Cadmium as Cd, mg/l	<.01
Calcium as Ca, mg/l	66.8
Carbonate as CO_3, mg/l	1.2
Chloride as Cl, mg/l	58.6
Chromium as Cr (Hex), mg/l	<.01
Chromium as Cr (Tot), mg/l	<.01
Molybdenum as Mo, mg/l	<.01
Acidity as $CaCO_3$, mg/l	0

PARAMETER	LEVEL
Conductivity, umhos/cm	514
Copper as Cu, mg/l	<.01
Fluoride as F, mg/l	<.1
Hardness as $CaCO_3$, mg/l	253
Hydroxide as OH, mg/l	0
Iron as Fe (Diss), mg/l	<.01
Iron as Fe (Tot), mg/l	0.078
Lead as Pb, mg/l	<.01
Magnesium as Mg, mg/l	31.8
Manganese as Mn, mg/l	<.01
Mercury as Hg, mg/l	<.0002
Nickel as Ni, mg/l	<.01
Nitrate as NO_3-N, mg/l	0.77
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	<.01
Potassium as K, mg/l	1.3
Selenium as Se, mg/l	<.002
Silica as SiO_2 (Diss), mg/l	7.1
Silver as Ag, mg/l	0.018
Sodium as Na, mg/l	16.7
Sulfate as SO_4, mg/l	53
Total Dissolved Solids, mg/l	351
Turbidity, NTU	0.72
Zinc as Zn, mg/l	0.048
pH Units	8.37
Cations, meq/l	6.72
Anions, meq/l	6.42

Rex Henderson

Memorandum

Date: January 21, 1988

To: Brian W. Buck

From: Elliott W. Lips EWL

Re: Pine Canyon Waterfall

A survey point was established on January 28, 1987. The survey control consists of a steel pin cemented into the toe of the slag pile, on the south side of the canyon, approximately 100' upstream of the waterfall. Measurements are made with an aluminum rod configured with a 90 degree junction at one end. The rod is positioned on the ground with the 90 degree junction snugly against the edge of the waterfall. The distance from the edge of the waterfall to the survey pin constitute the data. The stream is braided immediately upstream of the waterfall, and has two branches that spill over the waterfall. These branches are referred to as the left and right branch, as viewed looking downstream.

Measurements of each branch are as follows:

Date	Left Branch	Right Branch
1/28/87[1]	103' 6"	100' 2"
5/14/87[1]	99' 10"	99' 4"
8/10/87[1]	99' 7"	99' 6"
12/4/87[2]	99' 10"	96' 10"

1 Measurements by EWL using full survey rod.
2 Measurements by RJB using only short half of survey rod, reported lots of vegetation possibly introducing inaccuracy in the measurement.

Summary

In almost one year of quarterly monitoring, the left branch has migrated upstream approximately 3' 8", the right branch approximately 3' 4".

Sketch of Waterfall